

# LUMPED-ELEMENT TRANSMISSION LINE IN MULTI-LAYERED SUBSTRATE

## Abstract

A lumped-element transmission line is formed in a multi-layered substrate. A mutual inductance between first and second inductors in a T-equivalent circuit model is enlarged to a designed positive value to widen the application frequency bandwidth of the transmission line. The second inductor is electrically connected to the first inductor in series at one end. The first and second inductors are spiral in shape and the orientations of the first inductor and the second inductor are the same so that the spirals progress in the same sense such that a mutual inductance between the first and second inductors is positive and equals a first value. A first capacitor is electrically connected to ground at a first end of the first capacitor, and a second end of the first capacitor is electrically connected to the end of the second inductor at which the second inductor is connected to the first inductor.